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NEW SPECIES OF ALIGIA (HOMOPTERA CICADELLIDAE)

Leon Hepner, Lawrence, Kansas*

Aligia dellana suffusca n. sub sp.

Resembles **dellana** but usually darker with the aedeagus of the males somewhat longer. Length: male 4 mm., female 4.5 mm.

Vertex rounded, alost parallel margined, much wider between eyes than length at middle, transverse furrow almost absent. Crossveins in tegmen few in number.

Color: Female with vertex and scutellum white to brown, with typical markings sometimes evident, pronotum darker. Tegmen semihyaline to white with two crossbands yellow to brown, veins darkening posteriorly. Males with vertex and scutellum yellow to brown with typical markings seldom evident. Tegmen light brown to foscous excepting few spots semihyaline to white in a band across second cross nervure and in region of anteapical cells and two or three fuscous spots in clavus. Veins darkening posteriorly.

Genitalia: Pygofer somewhat more oval and shorter than **dellana**, about three-fourths as wide at constriction as distance from there to apex; pygofer hook extending to apex of pygofer, twisted near middle, almost parallel-sided to outer fifth with short, sharp, recurved process on dorsal margin near apex. Aedeagus in lateral view longer than **dellana**, about five times as long as basal width, curved strongly on basal third, narrowing gradually to less than one-half basal width at middle, almost parallel margined to apex; in ventral view parallel sided, bifurcate on outer fourth and bearing a pair of lateral processes about one-third length of shaft of aedeagus. Styles about three times as long as basal width, sinuately narrowed to one-fifth basal width on outer fourth, apices bluntly pointed.

Types: Holotype male, allotype female, and 5 female and 2 male paratypes, Arroyo Seco River, Calif., Aug. 8, 1939, R. H. Beamer in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Other paratypes as follows: 4 females, Arroyo Seco River, Calif., Aug. 8, 1938, L. W. Hepner; 1 male, R. I. Sailer; 8 females, 5 males, Santa Rosa, Calif., Aug. 16, 1938, R. H. Beamer; 5 females, 4 males, L. W. Hepner; 1 male, Dulzura, Calif., Aug. 9, 1935, R. H. Beamer; 1 female, 3 males, Lockwood, Calif., July 24, 1935, R. H. Beamer; 2 females, 1 male, Idyllwild, Calif., Aug. 3, 1935, R. H. Beamer; 17 females, 2 males, Topango Canyon, Calif., Aug. 5, 1938, R. H. Beamer, 1 female, L. W. Hepner; 12 females, 2 males, Red Bluffs, Calif., June 27, 1935, R. H. Beamer; 17 females, 8 males, Sonora, Calif., July 11, 1933, R. H. Beamer; 2 females, Redding Calif., June 28, 1935, R. H. Beamer, 5 females, 1 male, P. W. Oman; 4 females, 2 males, Cajon Pass, Calif., Aug. 6, 1936, R. H. Beamer; 3 females, Clayton, Calif.. July 20, 1935. R. H. Beamer;

*Contribution from the Department of Entomology, University of Kansas

2 females, Lemon Cove, Calif., July 26, 1929, R. H. Beamer; 1 female, Delta, Calif., June 28, 1935, R. H. Beamer; 1 female, Bowman, Calif., July 20, 1938, L. W. Hepner; 1 female, Alameda, Co., Calif., July 19, 1933, Jean Russell; 2 females, Three Rivers, Calif., July 8, 1932, R. H. Beamer, 3 males, June 9, 1935, P. W. Oman; 1 male, Pasadena, Calif., July 12, 1931, E. D. Ball; 1 female, Mint Canyon, Calif., July 7, 1933, R. H. Beamer; 7 females, Paynes Creek, Calif., June 27, 1935, P. W. Oman; 1 male, Lompoc, Calif., Aug. 6,.1938, L. W. Hepner; 1 female. Santa Cruz Mts., Calif., Aug. 13, 1938, L. W. Hepner.

Aligia pallida n. sp.

Resembles **dellana** but almost without darker markings and male with double pygofer hook. Length: male 4.5 mm., female 5 mm.

Vertex rounded, almost parallel margined, about three times as wide between eyes as length at middle, transverse furrow very shallow; cross-veins usually few in number.

Genitalia: Pygofer triangular, about as wide at constriction as length from there to apex; pygofer hook bifid, dorsal fork extending slightly beyond apex of pygofer, broadening to truncate apex, ventral fork almost as long, widening on outer half, usually bifid at apex. Aedeagus in lateral view about three times as long as basal width, almost parallel margined to outer fifth, widening suddenly on dorsal margin, apex triangular; in ventral view, narrow, parallel sided, bifurcate about one-fifth length of aedeagus and bearing a pair of lateral processes about one-third length of shaft of aedeagus. Styles over twice as long as basal width, sinuately narrowed to outer third with blunt apices.

Types: Holotype male, allotype female, Santa Rita Mts., Ariz., July 17, 1932, R. H. Beamer in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Paratypes as follows: 1 female, Santa Rita Mts., Ariz., June 12, 1932, P. W. Oman, 1 female, 1 male, June 22, 1930, E. D. Ball; 1 male, Chiricahua Mts., Ariz., July 14, 1938, R. H. Beamer, 1 female, July 5, 1930, E. D. Ball; 3 females, 1 male, Granite Dell, Ariz., July 30, 1933, R. H. Beamer, 1 female, Aug. 14, 1935, R. H. Beamer, 1 female, 1 male, May 30, 1935, P. W. Oman, 1 male, 2 females, July 17, 1929, E. D. Ball; 1 female, Tumicacori Mts., Ariz., July 22, 1938, R. H. Beamer; 1 female, Nogales, Ariz., June 25, 1933, R. H. Beamer; 1 male, Miami, Ariz., July 22, 1932, R. H. Beamer; 1 female, Tuscon, Ariz., June 9, 1929, E. D. Ball, 1 male, May 16, 1929, E. D. Ball; 1 male, Patagonia, Ariz., Sept. 7, 1929, E. D. Ball; 2 females, Huachuca Mts., Ariz., June 15, 1930, E. D. Ball.

Specimens that were collected in May and early June were much darker, with heavier and more numerous veins, evidently representing the over-wintering adults.

Aligia lutea n. sp.

Resembles **pallida** but more colorful, usually with cross-veins more numerous, with aedeagus broader and bearing a pair of extremely short lateral processes, and ventral fork of pygofer hook never bifid. Length: Male 4.5 mm., female 5 mm.

Vertex rounded, about two and one-half times as wide between

eyes as length at middle, transverse furrow very shallow; cross-veins in tegmen, although rather inconspicuous, are numerous throughout.

Color: Tawny throughout with typical markings sometimes faintly indicated, pronotum somewhat darker. Tegmen semihyaline, more or less suffused with tawny.

Genitalia: Pygofer triangular, about four-fifths as wide at constriction as length from there to apex; pygofer hook bifid, dorsal fork extending almost to apex, slender, widest on outer two-thirds, apex sharp; ventral fork about two-thirds as long, apex sharp. Aedeagus broad in lateral view, about twice as long as basal width, almost parallel sided and bifurcate on about outer fourth. Styles about two and one-half times basal width, sinuately narrowed to outer fifth, apices sharp.

Types: Holotype male, allotype female, Santa Rita Mts., Ariz., July 17, 1932, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Paratypes as follows: 1 female, Santa Rita Mts., Ariz., June 12, 1932, P. W. Oman; 3 females, Granite Dell, Ariz., July 30, 1933, R. H. Beamer, 1 female, July 14, 1935, R. H. Beamer, 2 females, 1 male, May 30, 1935, P. W. Oman, 3 females, July 17, 1929, E. D. Ball; 1 female, Yarnell. Ariz., June 29. 1933, P. W. Oman.

As in **pallida**, specimens collected early in the year are darker and more heavily veined than others.

Aligia chiricana alta n. sub sp.

Resembling **chiricana**, but slightly larger, with a sharper vertex and with pronotum greenish-yellow; males same as females. Length male 4.2 mm., female 5 mm.

Vertex slightly more produced at tip than **chiricana**, two and one-half times as wide between eyes as length at middle, transverse furrow shallow; cross-veins in tegmen few in number, three or four in costa and one or two in center apical cell.

Genitalia: Resembles **chiricana** but larger with the aedeagus slightly longer. Pygofer acute, longer than width at constriction; pygofer hook bifid, dorsal fork ending just before apex, widest at middle, tapering to a rather sharp point, ventral one about two-thirds as long, slightly more slender. Aedeagus in lateral view long and slender, narrowest on outer fourth, enlarged to about twice basal width, apex rounded; in ventral view, bifurcate on outer fourth and bearing a pair of lateral processes about one-sixth as long as shaft of aedeagus. Styles about two and one-half times as long as basal width, sinuately narrowing to a rather blunt apex.

Types: Holotype male, allotype female, and one female paratype, Chiricahua Mts., Ariz., July 14, 1938, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Additional paratypes as follows: 1 female, 1 male, Chiricahua Mts., July 14, 1938, L. W. Hepner. 1 female, 8 males, July 8, 1932, R. H. Beamer, 1 female, July 26, 1937, D. J. and J. N. Knull.

Aligia meridiana n. sp.

Similar to **modesta** but more highly colored and with the male pygofer truncate at apex. Length: male 4.5 mm., female 5.5 mm.

Vertex rounded, almost parallel margined, about three times as wide between eyes as length at middle, transverse furrow shallow. Veins in tegman distinct on outer half, cross-veins fairly numerous in corium.

Color: Vertex, pronotum and scutellum yellow-brown to orange, indications of typical markings usually present, face and clypeus yellow, sometimes with indications of dashes on clypeus. Tegmen of female semihyaline to white, with two reddish-brown crossbands separated by a light band about as wide as either, males similar, except that anterior band covers entire basal half of tegmen, veins of both always tawny, apical cells more or less infuscated.

Genitalia: Pygofer broad, wider on outer third than at constriction; pygofer hook extended beyond apex of pygofer, widest at base, almost parallel margined on outer three-fourths, apex sharp. Aedeagus broad in lateral view, a little more than twice as long as basal width, slightly narrowed from base to rounded apex; in ventral view, parallel sided, bifurcate on outer fifth and bearing a pair of lateral processes about one-half as long as shaft. Styles about three times as long as basal width, narrowed gradually to one-half basal width at middle, then both sides converging near outer sixth to about one-sixth basal width, apices strongly curved dorsally.

Types: Holotype male, allotype female, Fulton, Miss., July 14, 1930, L. D. Tuthill, in Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Paratypes as follows: 1 female, Meridian, Mississippi, July 17, 1930, P. W. Oman; 2 males, Fulton, Miss., July 14, 1930, R. H. Beamer; 1 male Iuka, Miss., July 14, 1930, R. H. Beamer; 2 males, Jefferson, Texas, June 21, 1938, R. H. Beamer; 1 male, Leavenworth, Kansas, June 30, 1924, E. P. Breakey; Coffeyville, Kansas, June 30, 1939, 3 males, L. W. Hepner; July 1, 1939, 7 males, 1 female; July 4, 1939, 7 males, 1 female: July 11, 1939, 3 males, 7 females; July 16, 1939, 2 males, 8 females; July 21, 1939, 13 females and July 25, 1939, 1 female.

Aligia bifurcata n. sp.

Resembles **magna** but smaller, tawny and without a semblance of a crossband. Length: male 5 mm., female 5.5 mm.

Vertex almost parallel margined, three to four times as wide between eyes as length at middle, transverse furrow shallow; numerous cross-veins throughout tegmen.

Color: Vertex and scutellum ivory yellow to light brown with typical markings somewhat darker, pronotum more or less irrorate with dark. Tegmen semihyaline to white, more or less suffused with tawny, veins darker, apical cells partly infuscated.

Genitalia: Pygofer more or less oval, about one and one-fourth times as long as width at constriction; pygofer hook bifid, dorsal fork

extending slightly beyond apex of pygofer, apex pointed, ventral fork about two-thirds length of dorsal, one-third wider, widest on outer third, apex pointed. Aedeagus in lateral view broad, about twice as long as basal width, sides almost parallel, narrowest on outer third, a pair of dorsal teeth just beyond, apex angular; in ventral view, bifurcate on outer third and bearing a pair of short lateral processes. Styles about twice as long as basal width, sinuately narrowed to outer sixth, apices sharp and curved.

Types: Holotype male, Huachuca Mts., Ariz., June 11, 1933, P. W. Oman, in the National Museum, Washington, D. C.; allotype female, Chiricahua Mts., Ariz., July 14, 1938, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Paratypes as follows: 3 females, Chiricahua Mts., Ariz., July 14, 1938, R. H. Beamer; 1 female, Huachuca Mts., Ariz., July 8, 1932. R. H. Beamer; 2 females, Glenn Oaks, Ariz., July 19, 1929, E. D. Ball.

Aligia acutata n. sp.

Resembles **magna** but smaller and more slender with a slender aedeagus without lateral processes and with forks of pygofer hook slender. Length: Male 5 mm., female 6 mm.

Vertex produced, about two and one-half times as wide between eyes as length at middle, transverse furrow prominent. Tegmen long with many corss-veins throughout.

Color: Vertex ivory yellow with two pairs of dark dots along anterior margin, a dark line along transverse furrow and a pair of lighter dots inside each eye. Pronotum grey flecked with fuscous except for a median longitudinal vitta and oftentimes a similar vitta on each side. Scutellum ivory yellow to light brown with typical markings darker. Tegmen semihyaline to white without any indication of a crossband, apical cells mostly fumose.

Genitalia: Pygofer acutely pointed at apex, broadly rounding on ventral margin, three-fourths as wide at constriction as length from there to apex; pygofer hook bifid, dorsal fork somewhat longer than pygofer, broadest at middle, apex sharp, ventral fork almost half as long as dorsal, very slender and almost parallel margined to sharp apex. Aedeagus in lateral view about five times basal width, slightly enlarged on dorsal margin near middle, dorsal teeth prominent, apex oval; in ventral view parallel sided and bifurcate on outer fifth. Styles slender, somewhat over twice as long as basal width, sinuately narrowed to outer fourth, apices long, slender and sharply pointed.

Types: Holotype male, allotype female and six female and two male paratypes, Huachuca Mts., Ariz., July 18, 1938, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Additional paratypes as follows: 2 females, 1 male, Huachuca Mts., Ariz., Aug. 22, 1935, R. H. Beamer, 2 females, 2 males, Oct. 31, 1937, P. W. Oman, 1 female, Aug. 2, 1927, R. H. Beamer; 5 females, 3 males, Chiricahua Mts., Ariz., July

14, 1938, R. H. Beamer, 2 females, 1 male, July 8, 1932, R. H. Beamer, 1 male, July 8, 1932, J. D. Beamer, 1 male, July 5, 1930, E. D. Ball, 1 female, July 14, 1938, L. W. Hepner, 1 male, June 9, 1933, R. H. Beamer; 2 females, Chiricahua National Monument, Ariz., Aug. 24, 1935, Jean Russell, 1 female, R. H. Beamer; 1 male, Santa Rita Mts., Ariz., July 17, 1932, R. H. Beamer, 1 female, 2 males, June 16, 1936, P. W. Oman, 1 female, 6 males, June 22, 1930, E. D. Ball, 2 females, Aug. 18, 1935, R. H. Beamer; 2 males, Tuscon, Ariz., Sept. 29, 1929, E. D. Ball, 1 male, Sept. 1, 1929, E. D. Ball, 1 female, 1 male, June 30, 1929, E. D. Ball.

Aligia pallidinota n. sp.

Resembles **inscripta** but with vertex, pronotum and scutellum light colored. Length male 5 mm., female 5.5 mm.

Vertex twice as wide between eyes as length at middle, produced in right angle to a more or less sharp tip, transverse furrow shallow. Veins in tegmen numerous on costa, in middle anteapical cells and on corium next clavus.

Color: Vertex and scutellum ivory white, a semblance of markings sometimes present; pronotum more or less mottled with grey, an indication of a pair of median longitudinal darker vittae; face, clypeus and margins of lorae fuscous, darker than **inscripta**. Tegmen semihyaline to white with two fuscous crossbands, light area between about half as wide as either, apical cells at least partly infuscated.

Genitalia: Pygofer more rounded than in **inscripta**, with apex blunter and fold along dorsal margin narrower; pygofer hook bifid, dorsal fork about twice as long as ventral, almost parallel with it on outer two-thirds, both about same width throughout. Aedeagus in lateral view about three times as long as basal width, narrowed evenly to one-third basal width just beyond middle, suddenly broadening to one-half basal width and tapering to blunt point; in ventral view, narrow, parallel sided, apex bifurcate one-third length of shaft of aedeagus. Styles more than twice as long as width at base, gradually narrowing to slightly over one-half basal width, constricting suddenly to one-fifth basal width, ventral margins curved to sharp apex.

Holotype male, allotype female and two female paratypes, Lompoc, Calif., Aug 9, 1938, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Additional paratypes as follows: 4 females, 1 male, Lompoc. Calif., Aug. 9, 1938. L. W. Hepner, 1 female, 3 males. R. I. Sailer; 2 females, 1 male, Dulzura, Calif., Aug. 9, 1935, R. H. Beamer.

The specimens from Dulzura are much lighter than those from the type locality, the dark areas of the tegmen being replaced by pale brown and the markings on the vertex being hardly visible.

Aligia obesa n. sp.

Resembles **bifasciata** but smaller with a shallower transverse furrow and with tegmen decidedly narrower at apex. Length: male 4 mm., female 5 mm.

Vertex round, almost parallel margined, about four times as wide between eyes as length at middle, transverse furrow shallow. Tegmen less flaring than either **munda** or **bifasciata**, distinctly narrower from tip of clavus to apex and closely appressed, giving the species a very narrow appearance posteriorly, cross-veins numerous throughout.

Color: Eyes red, vertex and scutellum ivory white to very pale brown, typical markings usually present, but light, pronotum more or less mottled with fuscous. Tegmen semihyaline to white with two brown crossbands, light area between about half as wide as either, veins brown, apical cells at least partly infuscated.

Genitalia: Pygofer oval, apex broadly rounded, about as wide at constriction as distance from there to apex; pygofer hook bifid, forks about equal in length, dorsal one about twice width of ventral, forks almost parallel along most of their length.. Aedeagus in lateral view between four and five times as long as basal width, narrowing gradually to one-half basal width at middle, slightly enlarged on dorsal margin just before bluntly pointed apex. Styles twice as long as basal width, slightly narrowed at middle, three-fourths basal width near outer fourth, suddenly narrowed to one-sixth basal width, finger-like process of apex parallel sided and curved.

Types: Holotype male, allotype female, Ozona, Tex., July 9. 1936, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Paratypes as follows: 1 female, Tucumcari, N. M., June 25, 1932, R. H. Beamer; 2 females, Concan, Texas, June 4, 1933, P. W. Oman.

Aligia rotunda n. sp.

Resembles **bifasciata**, but smaller with ventral fork of pygofer hook not greatly enlarged at base, Tegmen not narrowed at apex as in **obesa**. Length: male 4 mm., female 5 mm.

Vertex almost parallel margined, decidedly wider between eyes than length at middle, transverse furrow prominent. Venation as in **bifasciata**, with many cross veins.

Color: Eyes red, vertex and scutellum dull yellow with typical markings fulvous, pronotum darker, more or less marked with fuscous. Tegmen semihyaline to white with two dark bands, one anterior and one posterior to second cross nervure, veins dark, apical cells partly infuscated.

Genitalia: Pygofer almost round, slightly longer than width at constriction; pygofer hook bifid, forks about equal in length, extending to margin of pygofer with dorsal one about half as thick as ventral. Aedeagus in lateral view long, narrowest at middle, widest at base and on apical fourth, apex rather sharp. Styles more than twice as long as basal width, sinuately narrowing to outer fourth, apices curved and bluntly pointed.

Types: Holotype male, allotype female and one female paratype, Tombstone, Ariz., July 16, 1936, E. D. Ball, in the E. D. Ball, collection, Tuscon, Ariz. Additional paratypes as follows: 2 male paratypes, Tombstone, Ariz., June 8, E. D. Ball.

This species might be confused with **oculea**, but has a great many more cross veins and differs greatly in the internal genitalia.

Aligia bifasciata n. sp.

Resembles **munda** but slightly smaller, darker, with a shorter vertex and aedeagus in lateral view widest beyond middle. Length: male 4.75 mm., female 5.5 mm.

Vertex almost parallel margined, about four times as wide between eyes as length at middle, transverse furrow prominent. Numerous cross-veins throughout tegmen as in **munda**.

Color: Vertex light brown, a pair of black dots at apex, another pair near ocelli, a much lighter pair just inside each eye, transverse furrow dark. Pronotum irrorate with fuscous, a pale longitudinal median line indicated. Scutellum light, except a large spot in each basal angle, a pair of small dots between these, a transverse line near apex, and a median line, darker. Tegmen semihyaline to white with two fuscous crossbands, light area between about half as wide as either; apical cells as least partly infuscated.

Genitalia: Pygofer rounded, slightly longer than width at constriction, folded along ventral margin; pygofer hook bifid, forks almost equal in length, dorsal one more slender, ventral one enlarged on basal two-fifths. Aedeagus in lateral view very long, eight times basal width, narrowest next base, widest near outer third, narrowing gradually to blunt apex. Styles more than twice as long as width at base, narrowing gradually to one-half basal width at middle, slightly enlarged on outer fifth, converging suddenly to slender, curved pointed apices.

Types: Holotype male, allotype female and 1 pair of paratypes, Chiricahua Mts., Ariz., July 14, 1938, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Additional paratypes as follows: 1 female, Ruby Ariz., July 22, 1938. R. H. Beamer; 1 female, Santa Rita Mts., Ariz., Aug. 18, 1935, R. H. Beamer, 1 male, June 27, 1933, P. W. Oman, 1 female, June 16, 1933, P. W. Oman, 1 female, June 12, 1933, P. W. Oman; 2 males, Tuscon, Ariz., Oct. 20, 1929, E. D. Ball.

Aligia reticulata n. sp.

Resembles **descripta**, but with margins of vertex almost parallel, aedeagus short and wide in lateral view, and dorsal fork of pygofer hook broad at apex. Length: male 4.2 mm., female 5 mm.

Vertex almost parallel margined, about three times as wide between eyes as length at middle, transverse furrow prominent. Cross veins numerous throughout tegmen.

Color: Clypeus, anteclypeus, lorae and cheeks ivory yellow with typical markings fuscous, pronotum more or less mottled with

fuscous, scutellum light with apex and basal angles darker. Tegmen semihyaline to white, with sometimes a faint indication of crossband, veins dark, apical cells often slightly infuscated.

Genitalia: Pygofer oval, somewhat narrower at constriction than distance from there to apex; pygofer hook bifid, dorsal fork extending slightly beyond apex of pygofer, broadening on outer two-thirds to truncate apex; ventral fork short and about as wide as narrowest point of dorsal. Aedeagus in lateral view broad and short, about twice as long as basal width, broadest at base, tapering from there to a pair of short teeth on dorsal margin one-fourth distance from tip, apex triangular; in ventral view, bifurcate on outer fourth and bearing a pair of short lateral processes. Styles about twice as long as basal width, sinuately converging from base, apex sharp.

Types: Holotype male, allotype female, and one pair of paratypes, Miami, Ariz., July 22, 1932, R. H. Beamer, in the Francis Huntington Snow Museum, University of Kansas, Lawrence, Kansas. Additional paratypes as follows: 2 females, 1 male, Yarnell Heights, Ariz., June 29, 1933, P. W. Oman; 1 female, Yavapai Co., Ariz., July 1, 1929, R. H. Beamer; 1 female, Granite Dell, Ariz., July 30, 1933, R. H. Beamer; 2 females, Nogales, Ariz., July 25, 1933, R. H. Beamer; 2 females, Santa Rita Mts., Ariz., July, F. H. Snow, 1 female, May 30, 1930, E. D. Ball; 1 female, Tuscon, Ariz., June 16, 1933, 1 female, Oct. 20, 1929, E. D. Ball, 1 female, May 16, 1929, E. D. Ball.

Aligia atrivena n. sp.

Resembles **jucunda** but larger, darker and with more reticulations in tegmen. Length: male 5 mm., female 5.75 mm.

Vertex slightly produced, about three and one-half times as wide between eyes as length at middle, transverse furrow prominent.

Color: Vertex and scutellum ivory white to light yellow, with typical markings dark and distinct; pronotum gray more or less irrorate with fuscous with three pairs of dark spots along the anterior margin distinct. Tegmen semihyaline to white with veins fuscous, faint indication of crossbands sometimes present, apical cells partly infuscated.

Genitalia: Pygofer slender, rounded at apex, about one and one-fourth times as long as width at constriction; pygofer hook falcate, bent into right angle near base, distinctly widest near outer third, tapering to long sharp point. Aedeagus in lateral view long, bent dorsally in right angle near base, sides parallel to outer fourth, abruptly enlarged to large knob-like apex; in ventral view parallel margined, bifurcate on outer fifth and bearing a pair of lateral appendages about one-fifth as long as length of shaft. Styles about twice basal width, sinuately narrowed to outer fifth, apices curved and pointed.

Types: Holotype male, allotype female and 2 male paratypes, Yarnell, Ariz., July 29, 1933, R. H. Beamer, in the Francis Huntington Snow Museum, University of Kansas, Lawrence, Kansas. Additional paratypes as follows: 3 females, 3 males, July 25, 1932, R.

H. Beamer, 15 females, 5 males, June 29, 1933, P. W. Oman; 1 female, 1 male, Yavapai Co., Ariz., Aug. 9, 1927, R. H. Beamer; 1 female, Colfax Co., N. M., Aug. 21, 1927, R. H. Beamer; 1 female, Luna, N. M., July 25, 1936, R. H. Beamer; 1 female, Silver City, N. M., July 22, 1936, D. R. Lindsay, 1 female, July 23, 1936, R. H. Beamer; 1 male, Cloudcroft, N. M., June 30, 1932, R. H. Beamer; 1 male, Durango, Colo., July 6, 1937, R. H. Beamer; 2 males, Granite Dell, Ariz., May 30, 1935, P. W. Oman; 2 females, 3 males, Mayhill, N. M., June 7, 1933, P. W. Oman.

Aligia magna n. sp.

Resembles **munda** but slightly larger, darker and with a less angular vertex and with ventral fork of pygofer hook much enlarged on outer third; aedeagus with lateral processes. Length: male 4.2 mm., female 5 mm.

Vertex slightly angled, about two and one-half times as wide between eyes as length at middle, transverse furrow prominent; tegmen long, broadest on basal fifth, many cross veins throughout.

Color: Vertex and scutellum ivory to white with typical markings fulvous, pronotum more or less irrorate with fuscous. Tegmen semihyaline to white with fuscous markings darker, cross-bands usually faintly evident, veins dark.

Genitalia: Pygofer triangular, broadly rounded on ventral margin, almost as wide at constriction as distance from there to apex; pygofer hook bifid, dorsal fork extending about to apex of pygofer, broadest on apical half, irregularly notched on ventral margin and sharply pointed, ventral fork slightly over one-half as long, enlarged to twice basal width on outer fourth. Aedeagus in lateral view slender, about three times as long as basal width, narrowest on outer fourth, apical dorsal teeth about as long as width of shaft at narrowest point, apex oval; in ventral view slender, parallel margined, bifurcate on outer fourth and bearing a pair of short, erect processes one-third length of shaft of aedeagus from apex. Styles about twice as long as basal width, sinuately narrowed to a typical apex.

Types: Holotype male, allotype female and 20 female and 6 male paratypes, Huachuca Mts., Ariz., July 18, 1938, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Additional paratypes as follows: 2 females, Huachaca Mts., Ariz., Aug. 22, 1935, R. H. Beamer; 2 females, June 11, 1933, R. H. Beamer, 4 females, Oct. 30, 1937, P. W. Oman. 2 males, June 15, 1930, E. D. Ball, 2 females Aug. 2, 1931, E. D. Ball; 15 females, Chiricahua National Monument, Aug. 24, 1935, R. H. Beamer; 7 females, Jack Beamer, 5 females. Jean Russell; 2 females, 1 male, Chiricahua Mts., Ariz., July 14, 1938. R. H. Beamer, 1 male, July 14, 1938, R. I. Sailer, 1 male, July 8, 1932, J. D. Beamer.

Aligia obtusa n. sp.

Resembling **jucunda**, but slightly larger, darker, with a broader, shorter vertex and with pygofer hook much broader on outer half. Length: male 4.5 mm., female 5.25 mm.

Vertex rounded, parallel margined, about four times as wide between eyes as length at middle, transverse furrow very shallow.

Tegmen less flaring than normal with a moderate number of crossveins.

Color: Vertex and scutellum ivory white to light yellow with typical markings light brown. Pronotum gray, more or less flecked with fuscous. Tegmen semihyaline to white marked with fuscous, faint semblance of crossbanding usually evident, veins dark, apical cells partly infuscated.

Genitalia: Pygofer broad, bluntly pointed, about as wide at constriction as distance from there to apex; pygofer hook extending to margin of pygofer, bent into gooseneck near base, broadening to over twice narrowest width near middle, then narrowing to a sharp apex. Aedeagus in lateral view short, about two and one-half times basal width, narrowest on outer third, dorsal teeth small and pointed, in ventral view, broadening toward apex, bifurcate on outer third and bearing a pair of lateral processes almost one-third length of shaft of aedeagus. Styles about twice basal width, sinuately narrowed to outer fifth, apices slender and bluntly pointed.

Types: Holotypes male, allotype female and 3 male paratypes, Granite Dell, Ariz., May 30, 1935, P. W. Oman, in the National Museum, Washington, D. C. Additional paratypes as follows: 1 female, Huachuca Mts., Ariz., June 11, 1933, R. H. Beamer.

Aligia falcata n. sp.

Resembles **munda**, but with more rounded vertex, less crossveins in tegmen and pygofer hook falcate. Length: male 5.25 mm., female 6.25 mm.

Vertex rounded, almost parallel margined, about four times as wide between eyes as length at middle, transverse furrow almost absent; few cross veins in tegmen, except in corium next clavus and in middle anteapical cell.

Color: Vertex and scutellum ivory white to yellow with markings indistinct except large brown spot in each basal angle of scutellum; pronotum grey to yellow, more or less irrorate with brown. Tegmen semihyaline to white with two indistinct fuscous bands separated by a light area about as wide as either, apex more or less infuscated.

Genitalia: Pygofer slender, about one and one-half times as long as width at constriction; pygofer hook falcate, almost parallel margined to outer fourth, then narrowed on dorsal margin to sharp apex. Aedeagus in lateral view slender, about twice as long as basal width, almost parallel margined to outer fourth, apex rounded; in ventral view parallel margined, bifurcate on outer fourth. and bearing a pair of lateral processes about as long as one-fourth length of shaft of aedeagus. Styles about twice basal width in length, sinuately narrowing to outer fifth, apices curved and pointed.

Types: Holotype male, allotype and 2 male paratypes, Oak Creek Canyon, Ariz., Aug. 14, 1927, R. H. Beamer, in the Francis

Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Additional paratypes as follows: 4 females, 1 male, Old Creek Canyon, Ariz., July 31, 1933, R. H. Beamer, 1 male, Aug. 9, 1932. R. H. Beamer; 1 male, Huachuca Mts., Ariz., Aug. 2, 1927, R. H. Beamer, 1 female, June 10, 1933, R. H. Beamer, 1 female, Oct. 30, 1937, P. W. Oman; 1 female, Grand Canyon, Ariz., July 28, 1936, J. D. Beamer, 1 female, Aug. 11, 1927, L. A. Anderson; 1 female, Prescott, Ariz., Aug. 7, 1932, J. D. Beamer, 1 female, July 29, 1933, R. H. Beamer.

Aligia curtipennis n. sp.

Resembling **jucunda** but slightly larger with a s..arp vertex, shorter aedeagus and pygofer hook much wider on outer half than next base. Length: male 5 mm., female 5.75 mm.

Vertex slightly pointed, about three times as wide between eyes as length at middle, transverse furrow prominent. Tegmen marked about as in **jucunda** with cross-veins few in number.

Color: Vertex and scutellum ivory white to yellow with typical markings fuscous and distinct. Pronotum gray, more or less marked with fuscous, a narrow line along posterior margin and median longitudinal vitta unmarked, three pairs of dots along anterior margin usually distinct. Veins in tegmen fuscous with crossbands at least faintly indicated, apical cells partly infuscated.

Genitalia: Pygofer about as long as width at constriction, apex pointed; pygofer hook extended to margin of pygofer, parallel margined and bent into gooseneck on basal half, broadening to about three times narrowest width on apical third, then narrowing to short sharp point. Aedeagus in lateral view relatively short, narrowest near base, gradually widening to twice basal width on outer fourth and bearing a pair of lateral processes about one-fifth length of shaft of aedeagus. Styles about twice basal width, sinuately narrowed to outer fifth, apices strongly curved and blunt.

Types: Holotype male, allotype female and 5 female and 3 male paratypes, Cedar City, Utah, Aug. 13, 1929, R. H. Beamer, in the Francis Huntington Snow Entomological Museum, University of Kansas, Lawrence, Kansas. Other paratypes as follows: 2 females, 3 males, Richfield, Utah, Aug. 19, 1930, E. W. Davis, 4 females, 2 males, Sept. 2, 1930, E. W. Davis, 4 females, 2 males, Sept. 12, 1930, E. W. Davis; 1 female, 5 males, Heber City, Utah, July 25, 1933, Davis and Dorst; 2 females, Salina, Utah, Aug. 15, 1930, E. W. Davis; 1 female, Elsinor, Utah, Oct. 5, 1929, David R. Fox; 1 female, Butlerville, Utah, Aug. 31, 1935, G. F. Knolton; 2 females, 3 males, Barclay, Utah, July 2, 1931, R. H. Beamer; 2 females, 7 males Pintura, Utah, Aug. 11, 1929, R. H. Beamer; 4 females, 15 males, Sloss, Colo., Aug. 17, 1929, R. H. Beamer; 2 females, 2 males, Palmer Lake, Colo., July 23, 1900, E. D. Ball, 3 females, 1 male, June 18, 1901, E. D. Ball; 2 females, 3 males, Glenwood Springs, Colo., Aug. 17, 1929, R. H. Beamer; 1 female, 5 males, Taos Pass, N. M., June 13, 1932, R. H. Beamer; 1 male, Oak Creek Canyon, Ariz., Aug. 9, 1932, R. H. Beamer, 1 male, July 31, 1933, R. H. Beamer; 2 males, Cloudcroft. N. M., June 28, 1932, R. H. Beamer; 1 male, Salida, Colo., July 24, 1900.

Aligia utahna n. sp.

Resembling **jucunda** but slightly larger with a sharp vertex, darker markings, less reticulations on tegmen and with the aedeagus somewhat longer. Length: male 5 mm., female 6 mm.

Vertex distinctly pointed, about two and one-fourth times as wide between eyes as length at middle, transverse furrow quite distinct. Venation of tegmen much as **jucunda**, usually with five to seven veins in the costa.

Color: Vertex and scutellum ivory white to light yellow with typical markings fuscous; pronotum gray, more or less mottled with fuscous, excepting a broad band along the posterior margin and longitudinal median vitta, three pairs of dark spots along anterior margin distinct; tegmen semihyaline to white with fuscous veins, crossbands sometimes very faintly indicated, apical cells mostly clear.

Genitalia: Pygofer oval, about three-fourths as broad at constriction as distance from there to apex; pygofer hook falcate, extending to margin, apex sharp. Aedeagus in lateral view long, clavate, narrowest on basal fourth, apex rounded, more than twice as wide as narrowest place; in ventral view bifurcate on outer fifth and bearing a pair of lateral processes about one-fifth length of shaft of aedeagus. Styles slender, almost three times as long as basal width, sinuately narrowing on outer fifth, apices almost parallel margined, apex curved dorsally.

Types: Holotype male, allotype female, Granite, Utah, June 26, 1936, M. W. Allen, in the National Museum, Washington, D. C. Paratypes as follows: 2 males, Butlerville, Utah, June 16, 1936. G. F. Knowlton; 1 female, 1 male. Panguitch, Utah, Sept. 4. 1932. E. W. Davis; 1 male, Salt Lake City, Utah, July 3, 1931, R. H. Beamer, 1 male, Sept. 5, 1933, Davis and Dorst; 2 males. St. George, Utah, May 1, 1933. E. W. Davis; 1 male, Barclay, Utah. July 2. 1931. R. H. Beamer; 3 males. Cove Fort, Utah. Aug. 14, 1929. R. H. Beamer: 2 males. Richfield. Utah. Fish Lake. Mt.. Aug. 19, 1930; 1 male, Cedar City, Utah, Aug. 13, 1929, R. H. Beamer.

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NOTE ON PTOMAPHAGUS CAVERNICOLA SZ* IN ARKANSAS CAVES

This species was originally described from four specimens collected in Marble Cave, Stone County, Missouri, over 40 years ago, and has subsequently been recorded from Onyx Caves. Washington County, Missouri by Hatch. (Jr. N. Y. Ent. Soc., XLI, 1933, p. 204). Several caves in Washington and Benton Counties in Arkansas have yielded the species by hundreds. The beetles are found crawling over the cave floors, in bat and raccoon dung, in decayed vegetable debris washed and carried into the caves, and is attracted readily to ground beef and banana peel when allowed to decay. No specimens were collected within the "twilight" zone of the caves, but frequently many hundreds of feet from the entrances.

MILTON W. SANDERSON

*Coleoptera, Catopidae.

BLISTER BEETLES AND LADYBIRD BEETLES TAKEN AT A NEBRASKA LIGHT TRAP*

Don B. Whelan, University of Nebraska

For the six years, 1933 to 1938, inclusive, a light trap has been in operation in Lincoln in connection with a cutworm project. During these years a record of the various species and numbers of blister beetles and ladybird beetles was kept to learn their relative abundance, their seasonal activity and the reaction of the different species to lights. As a result of this study four species of blister beetles and nine species of ladybird beetles have been taken. The light trap was located on the corner of the insectary, about seven feet above the ground, and was visible for a long distance to the north, east and south.

Two different kinds of traps were used. In 1933 and 1934 a small rain-proof trap, designed by the writer was in operation and during the remainder of the time a larger open trap designed by H. H. Walkden was used. The former trap was equipped with a 200 c. p. mazda lamp and the latter with a 500 c. p. mazda lamp.

Blister Beetles (Meloidae)

1. **Macrobasis segmentata** Say. This species is represented by a single specimen caught on July 9, 1938.

2. **Macrobasis unicolor** Kby. The total number caught during the different years, with their peaks of abundance, was: 1933, 100 beetles, the first reported on June 2, the last on July 9 and the greatest number during the second week in June. In 1934, 21 beetles were taken, the first on May 8, the last on June 27 with the greatest number listed during the first week in June. In 1935, only one beetle was caught, on July 21. In 1936, 105 beetles were captured, the first on June 8, the last on July 13 with the greatest abundance during the second and third weeks of June. One-third of the adults were collected during the night of June 15. In 1937, 187 beetles were taken the first on May 28, the last on July 24, while the greatest number were caught during the third (70) and fourth (63) weeks of June. In 1938, 101 beetles were captured, the first on May 19, the last on July 5, with the greatest abundance during the fourth week and nearly half (49) on the night of June 23.

3. **Epicauta lemniscata** Fab. This was the most abundant species of blister beetle caught in the light trap during each of the years. Its activity also extended over a much longer period than any of the others. In 1933, 54 beetles were captured, the first on June 16, the last on September 2 with the seasonal activity general and no out-

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standing peaks of abundance. In 1934, 47 beetles were captured, the first on June 1, the last on September 12, with no peaks of abundance. In 1936, 75 beetles, the first on June 29, the last on September 13 with small peaks of abundance during the first weeks in August and September. In 1936, 1008 beetles were taken, the first on June 5 and the last on August 27. The greatest number were caught during the second and third weeks of July with the largest number between July 12 and 20 when 647 were captured. In 1937, 1491 beetles were taken, the first on June 3 and the last on September 18 with no real peaks of abundance. However, they were numerous during July and August. In 1938 occurred the greatest catch of any of the years when 3767 beetles were taken, the first ones on June 9 and the last on October 4. The largest number were taken during the third and fourth weeks in July. (The light was not in operation from July 30 to August 29.) The increase in abundance of this species during the past few years coincides with the continued abundance of grasshoppers.

4. **Pyrota engelmanni** (Lec.) Only four beetles were taken during the six years the light trap was in operation, as follows: 1936, one on May 30; 1937, one each on June 19 and 20, and, 1938, one on June 13.

Even though **Epicauta pennsylvanica** has been present on flowers and weeds nearby it has never been reported at any of the lights during the time of the above study.

Lady Beetles (Coccinellidae)

1. **Ceratomegilla fuscilabris** (Muls.). The only specimens of this species were taken in 1934 when one was caught in each of the two nights of June 6 and June 29.

2. **Hippodamia tredecim-punctata** (L.). In 1933, 63 beetles, the first on June 6, the last on September 13 with no peaks of abundance. The greatest single catch (11) was on July 15. In 1934, 43 beetles, the first on July 5, the last on August 9, with the greatest single catches (13 each) coming on the nights of July 5 and August 5. In 1936, 8 beetles, the first on June 4 and the last on July 7. In 1937, 78 beetles, the first on June 18, the last on September 14, with the largest number (13) on August 2. In 1938, 32 beetles, the first on July 2, the last on September 1 with the greatest number (8) caught on July 27.

3. **Hippodamia parenthesis** (Say). Only two specimens were taken both on July 5, 1935.

4. **Hippodamia convergens** Guer. In 1933, 9 beetles, the first on August 12 and the last on September 12. In 1934, 61 beetles, the first on May 8, the last on June 20 with the greatest number (46) caught between May 30 and June 2. In 1935, 8 beetles, the first on July 2 and the last on September 20 with four taken on July 5. In

1936, one beetle taken on August 12. In 1937, 43 beetles, the first on May 28, the last on August 11, with the greatest number (12) on August 3. In 1938, 20 beetles, the first on June 5, the last on September 27 with no peaks of abundance.

5. **Cycloneda sanguinea** (L.). In 1933, 7 beetles, the first on June 6, the last on September 22, with one each during July and August. In 1934, 13 beetles, the first on June 2 and the last on July 9, the largest number (5) caught on June 6. In 1935, 9 beetles, the first on June 26 and the last on August 25 with no more than a single specimen caught during any one night. In 1936, 5 beetles, the first on June 18 and the last on July 12. In 1937, 5 beetles, the first on June 18 and the last on August 3. In 1938, 4 beetles, the first on June 13, two during July and the last on September 23.

6. **Olla abdominalis** (Say). In 1933, 148 beetles, the first taken on June 7, the last on September 25 and most numerous from September 9 to 22. In 1934, one beetle caught on May 21. In 1935, two beetles, one each on August 5 and 10. In 1936, 10 beetles, the first on May 15, the last on August 14 and the remainder during the first half of July. In 1937, 10 beetles, the first on June 18, the last on September 14 with two in July and one in August. In 1938, 41 beetles, the first on June 13, the last on October 17 and most numerous during early October.

7. **Adalia bipunctata** (L.). In 1933, 23 beetles, the first May 20, the last on August 15 but most numerous during he second and third weeks in July. In 1934, 2 beetles, both taken on May 2. In 1935, 15 beetles, the first on June 24, the last on October 12 with no periods of abundance. In 1936, no beetles captured. In 1937, 4 beetles, all between June 20 and 23. In 1938, no beetles taken.

8. **Neomysia hornii var. interrupta** Csy. Only one specimen taken, on Aug 9, 1937.

9. **Chilocorus bivulnerus** Muls. In 1933, 18 beetles, the first taken on June 6, the last on September 9 with no peaks of abundance. In 1934 and 1935, no beetles captured. In 1936, 1 beetle taken on July 6. In 1937, 3 beetles, taken on June 19, June 20 and July 28. In 1938, 6 beetles, the first on June 30 and the last on September 7.

A NEW CAVE BEETLE OF THE SUBGENUS ADELOPS FROM OKLAHOMA*

Milton W. Sanderson, University of Arkansas

Ptomaphagus (Adelops) shapardi n. sp.

Length: 2.1-2.4 mm.; width: 1-1.2 mm.

Male:—Elongate oval, convex, rather strongly narrowed behind; color yellowish brown. Head very finely and evenly punctate, the hairs very short and erect. Eye very small, somewhat triangular and slightly more than its own width from base of antenna, usually strongly pigmented, often with an entire light margin around the area of pigmentation. Antenna testaceous and extending to posterior thoracic angle. Segments one to seven elongate, first segment wider and slightly longer than second and third segments which are subequal, fourth very slightly longer than fifth which is equal to and as broad as sixth, seventh longer than sixth widening toward apex, eighth narrower than seventh about one half wider than long and one half the length of ninth, ninth and tenth about as wide as long, wider toward apex, eleventh longer than tenth and narrowed in apical one half. The last five segments of antenna with a few long bristling hairs. Pronotum subequal in width to elytra, widest in basal one-fourth, two-thirds as long as wide. Hind angles acute, rather strongly sinuate on the inside. Surface very strongly transversely and irregularly strigose, especially near the posterior angles. Sides of prothorax gradually rounded from base to apex, the apex about two-thirds the width of base, Surface clothed with short decumbent hairs. Elytra widest at basal one-fifth thence rather suddenly narrowed to apex. Length a little more than twice that of pronotum. Surface obliquely strigose. Apex of each elytron nearly sub-truncate, broadly angulate internally and separately rounded. Entire upper surface clothed with short decumbent hairs among which there are five rows of short and erect hairs extending from base to apex. Basal four segments of front tarsi broadened and pubescent beneath.

Female similar to male except as follows: fourth antennal segment narrower than sixth, fifth slightly shorter than sixth, eighth fully twice wider than its length. Elytral apex obliquely sub-truncate and narrowly rounded at sutural angle.

Holotype male, allotype female, 21 paratypes, Dresser Cave, five miles north of Ft. Gibson, Oklahoma, January 13, 1939, E. R. Shapard. Three additional paratypes, same locality December 27, 1938, E. R. Shapard. All specimens collected in gravelly debris, in total darkness, about fifty feet from entrance of cave. Types and paratypes in the collection of the author. Additional paratypes in

*Coleoptera: Catopidae.

the U. S. National Museum, American Museum of Natural History, and the University of Kansas.

This species is the sixth of the subgenus Adelops to have been described from our fauna. The species is perhaps more closely related to **mitchellensis** Hatch by virtue of the pigmented condition of its eyes, the shorter antennae, and the acute hind angles of the pronotum. It differs, however, in its comparatively smaller size, the presence of distinct transverse strigae on the pronotum, and the longer third segment of the antenna. In **mitchellensis**, the third segment was described as shorter than the second while in this species it is fully as long. From other species in the genus the female differs readily by its non-spinose elytral apices.

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A NOTE ON FULGORIDS

In making a revision of the taxonomy of the sub-family Issinae, Fulgoridae, in America north of Mexico, two parts of which have already been published and two other parts of which are in manuscript, a few interesting facts of distribution have come to light. One noticeable fact is that the sub-family is primarily a southwestern group. Many of the species are taken only in California or Arizona, or both. For others, additional records are found, including a few other western states and western Canada, but the majority of species occur west of Kansas. Of the twenty-two genera occurring in the territory covered by the monograph, only three have been taken in Kansas, and of the 131 species discussed, only eleven are recorded from Kansas. The species known to occur in Kansas are:

Bruchomorpha oculata Newman—a new record
Bruchomorpha tristis Stal—a new record
Bruchomorpha jocosa Stal
Bruchomorpha dorsata Fitch
Bruchomorpha pallidipes Stal
Bruchomorpha n. sp. (in manuscript)
Fitchiella fitchi (Melichar)
Fitchiella robertsoni Fitch
Aphelonema rugosa (Ball)
Aphelonema bivittata (Ball)
Aphelonema simplex Uhl.

KATHLEEN DOERING

TWO NEW CORIXIDAE FROM MEXICO

H. B. Hungerford, Lawrence, Kansas*

In 1933 Dr. T. Jaczewski[1] described **Sigara ocotlanensis** from a male specimen lacking both front and middle legs. His specimen came from Ocotlan, Mexico. Since the front pala of this insect is lacking, it is necessary to base the determination of this species upon such other characters as are mentioned in his description and upon his sketches of right clasper, strigil, and seventh abdominal tergite. Since he states that the "species seems to stand closest of all to **Arctocorixa beameri** Hungerford," to possess a prestrigilar tuft of hairs on the fifth abdominal tergite, and to have the central lobe of the seventh abdominal tergite strongly developed, I have been hoping to recognize the species amongst the numerous collections of Mexican Corixidae available to me. However, the species which I tentatively identified as **S. ocotlanensis** appears upon closer analysis not to be that species and I describe it below:

Sigara beameroidea new sp.

Size: Length 5.7 mm. to 6 mm; width across head 2 mm. to 2.1 mm. A fairly short compact species.

Color: General facies as in **S. beameri** (Hungerford), the pale lineations not conspicuous. About eight pale bands on pronotum, those on hemelytra more or less effaced, the lighter figures broad, yet so dark that the general effect is dark.

Structural Characteristics: Head broad and short, that of male slightly longer than that of female as seen from above. Interocular space slightly greater than eye width in female. Face of male broadly depressed. Pronotum, clavus and basal half of corium rastrate. Legs short and stout. Metaxyphus long and slender. Odoriferous gland pores guarded by some strong spinelike hairs. The pala, abdominal dorsum and the genital capsule of the male as shown in the drawings.

Location of Types: Described from seven males and seven females taken twelve miles west of Villa Victoria, State of Mexico, March 23, 1939. I also have three males from Puebla Puebla, Mexico, taken by Henry Thomas, August 16, 1937. Holotype, allotype, and paratypes in Francis Huntington Snow Entomological Museum.

Comparative Notes: This species must be very near **S. ocotlanensis** Jaczewski, from which it differs in characters that cannot be ignored. The shape of the seventh abdominal tergite cannot be reconciled with the drawing given by Dr. Jaczewski of his species. The strigil, while guarded by hairs projecting from a lobe of the

*Contribution from the Department of Entomology, University of Kansas.

[1]Annales Musei Zoologici Polonici, Tom IX, Nr. 21, pp. 333-335.

fifth tergite, consists of six or eight rows instead of four as in S. ocotlanensis Jaczewski, and the right clasper has a characteristic bend on its concave margin not seen in Dr. Jaczewski's species. It also lacks the small denticulations on its inner margin just before the blunt apex described from Dr. Jaczewski's species. In none of the seventeen specimens is there any clear indication of a pale, oblique stripe on the membranal suture. In all of my specimens the left membrane is hyaline, the right one more pigmented.

Sigara conata n. sp

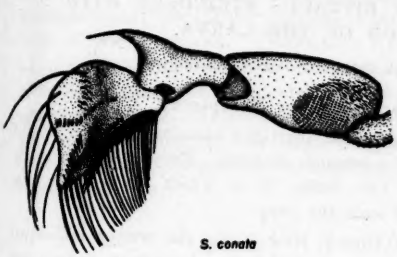
Size: Length 5.7 mm.; width across the head 2.1 mm. A fairly short, compact species.

Color: General facies much as in S **beameri** Hungerford, the pale lineations not conspicuous. Eight or nine pale bands on pronotum, those of hemelytra more or less effaced, the lighter figures broad, yet so dark that the general effect is dark.

Structural Characteristics: Head broad and short, shorter than in the species above. Face of male only moderately flattened, not depressed. Front margin of vertex broadly rounded as seen from above. Pronotum, clavus, and base of corium rastrate. Legs relatively longer than in above species, the middle femur having a thick patch of straw colored hairs on the distal third of the rear margin. These are matted down in the two specimens at hand and give the femur the appearance of being enlarged on its outer third. Metaxyphus long and slender. Odoriferous gland pores, prominent and guarded by hairs. The pala, abdominal dorsum and the genital capsule of the male as shown in the drawings.

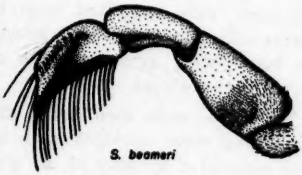
Location of Types: Described from two males taken twelve miles west of Villa Victoria, State of Mexico, on March 23, 1939. Types in the Francis Huntington Snow Entomological Collections.

Comparative Notes: This easily identified species is somewhat uncertain in its relationships. The strigil is located at the end of an elongation of the sixth abdominal tergite. **Sigara (Morphocorixa) lundbladi** Jacz. and **Sigara (Morphocorixa) compacta** (Hungerford) have a similar prolongation but no strigil. The pala is unique, while the cone-shaped expansion of the front tibia may be an extreme expression of a much less noticable expansion of the tibia in S. **beameri** (Hungerford). The right lobe of the eighth abdominal segment is but slightly constricted at its outer base and does not show any indication of the lateral projection of this lobe which is so characteristic in **Sigara (Morphocorixa) lundbladi** Jaczewski.



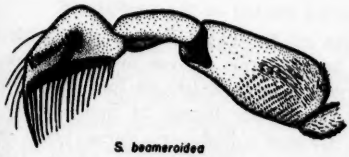
S. conata

S. conata



S. beameri

S. beameroidea



S. beameroidea

S. conata

S. bameroidea

THE LIFE HISTORY OF BITTACUS STRIGOSUS WITH A DESCRIPTION OF THE LARVA.

L. R. Setty, Park College, Parkville, Missouri

(Family Bittacidae, Order Mecoptera)

The adults of **Bittacus strigosus** (striated hanging-fly) are found in shady woodlands during the summer months. They often occur in great numbers among the low herbs from which they hang by their front pair of tarsi and wait for prey.

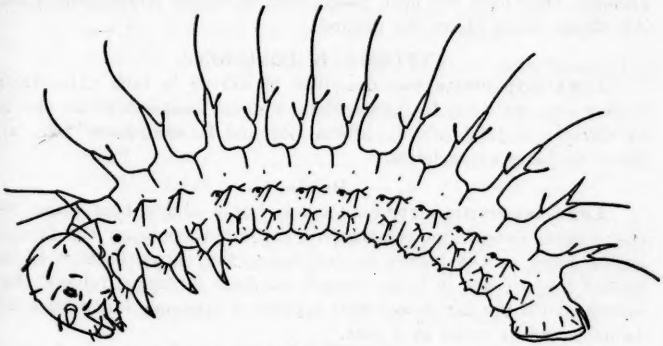
From a wooded area at Ithaca, New York, the writer collected during July, 1938 some of the females and placed them in individual cages (half-pint fruit jars), each with a small twig for support of the hanging-fly. Within a few hours, eggs were deposited upon the bottom of the cage. These eggs were collected and placed between two thin layers of asbestos. The latter were arranged upon the ground in a small screen framework for the winter.

The eggs hatched on May 5. The larvae were then placed upon some damp soil in a glass container and were provided with bits of earthworm for food. Growth was completed by May 25, at which time the larvae entered the soil to pupate. The adults emerged from the soil on June 12. Thus the whole life cycle of **B. strigosus** requires one year, the winter being passed in the egg stage.

The description of the larva of **B. strigosus** (together with a figure of a lateral view of the first instar) is given here as follows:

Length of one day old larvae 3 mm.; width .64 mm.; width of head capsule .56 mm. Length of mature larvae 14 mm.; width 4 mm.; width of head capsule 1.5 mm. Body eruciform type and arched upward. Segmentation distinct. Head hypognathous. General body color gray; head brown. Anterior margin of pronotum with three dorso-cephalin seta-bearing protuberances on each side; the most lateral protuberance with a very small seta-bearing protuberance attached to its base in the full grown larva. Most of the body segments with a pair of elongate dorsal protuberances; each protuberance with a long filiform seta at its distal end and with two small seta-bearing protuberances on its surface. These protuberances on thorax frequently with soil packs and surface of body with thin film of soil. The dorsal protuberances about as long as the height of the body segment in very young larvae; but distinctly shorter than height of the body segment in older larvae. Dorsal protuberances of the eighth and ninth segments terminating in a peg-like seta and with three small seta-bearing protuberances on their surface. Tenth segment with but a single median protuberance bearing a peg-shaped seta. Each side of nearly all body segments with a lateral protuberance bearing three setae; ventrad of each lateral protuberance, a small one with three setae. A spiracle present on

each of the first eight abdominal segments cephalad of main lateral protuberance; one larger spiracle near the caudal margin of each side of the prothorax. Prothoracic legs closer together than those of meso- and meta-thorax. One pair of prolegs on the first eight abdominal segments. Last abdominal segment with protrusile sucker around the anus. Antennae short. Group of seven ocelli caudo-dorsad of each antenna; one large ocellus at the anterior end of the coronal suture. Mandibles dark brown at distal end. Setae of head slightly clavate.



The egg and the pupa of **B. strigosus** are much like those of Say's hanging-fly (1931 Setty: Biology of **B. stigmaterus**, Ann. Ent. Soc. Amer. 24: 467-484) and those of the brown-spotted hanging-fly (**B. punctiger** in the author's thesis at Cornell University). The adult of **B. strigosus** is, of course, well known to most entomologists.

—□—

A FAMILY OF COLEOPTERA, BRATHINIDAE, NEW TO ARKANSAS

On October 31, 1938, in Benton County, Arkansas, the writer collected five specimens of **Brathinus nitidus** LeC. The beetles were taken in damp to wet leaves, in a deep and narrow ravine, near the mouth of a sink hole. The individuals were very active and in nature strongly resembled some of the more slender Carabidae or Scydmaenidae. The superficial resemblance to the latter family is so strong that LeConte was originally led to include the two eastern species in the Scydmaenidae. The only other species known in the United States are **Brathinus varicornis** LeC., described from New York, and **Brathinus californicus** Hub. **B. nitidus** LeC. has heretofore ranged from New York to Nova Scotia westward to the Lake Superior region. Little is known regarding the habits of this family.

MILTON W. SANDERSON

THE BIOLOGY OF LEMA SEXPUNCTATA OLIV.[1]

Garvin Green, Department of Entomology, University of Arkansas[2]

Lema sexpunctata[3] is a leaf beetle in the subfamily Criocerinae which feeds on the day flower, **Commelina communis** L., in both larval and the adult stages. The species is of interest because the larva forms a frothy cocoon in which it pupates, a habit not common among leaf beetles. The larvae, like those of other species in the genus, carry excrement on their back. The adults stridulate when picked up although they have not been heard making sounds when undisturbed. All stages occur above the ground.

SYSTEMATIC POSITION

Lema sexpunctata was described by Oliver in 1808 (2). There is only one synonym, **L. sexmaculata,** a name assigned to the species by Germar in 1823 (2). **L. albina** Lac and **L. ephippium** Lac. are listed by Leng as varieties.

Habits

Lema sexpunctata apparently has but a single host plant, the day flower, **Commelina communis.** The adult feeds on the foliage, eating holes in the leaves or destroying the entire tissue. If the beetles are present in large enough numbers stripping foliage often occurs, and if the day flower were a plant of economic importance this Lema would be rated as a pest.

The beetle is diurnal. When the adult is disturbed it drops to the ground where it runs away or takes short flights to other plants. When picked up the beetle stridulates by rubbing the pygidium against the apices of the elytra.

Eggs are deposited on their sides, on the underside of the leaf. The eggs may be deposited singly but are usually in small groups.

The larva feeds on the epidermis of either side of the leaf or on the stem, without eating holes through the leaves as do the adults. Excrement is carried on the back of the larva during the feeding period. The anus is located dorsally just before the apex. When the larva has passed 4 instars and is full grown, it drops to the ground to spin its cocoon.

The full grown larva prefers a dark place as under leaves or trash to spin its cocoon. A white foamy substance issues from the mouth to form the cocoon around the larva. The secretion dries and becomes quite strong. The larva ceases active cocoon spinning when

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[1]Research Paper No. 654. Journal Series, University of Arkansas.

[2]The writer wishes to acknowledge help received from various members of the Department of Entomology at the University of Arkansas—Professor Dwight Isely for suggesting the problem and general procedure; Doctor Albert Miller for checking the drawings; Doctors W. J. Baerg and H. H. Schwardt for photographs.

[3]Family Chrysomelidae, order Coleoptera.

being observed, probably because of disturbing light. The foamy substance is arranged by the mouth around the body of the larva.

The egg is cylindrical with the ends rounded, and is about .88 mm in length and .42 mm in diameter. Its color is translucent white and the surface is smooth and shiny.

There are four larval instars. The larva is white with a translucent tan stripe down the back. The head is black in the first instar and white to tan in the remaining instars. When viewed from above the larva is ovoid in outline tapering considerably anteriorly. Its greatest width is about at the fifth abdominal segment.

A larva has six ocelli on each side of the head.

The width of the head capsule of the larva of each instar is as follows:

First instar	.33 to .34 mm.
Second instar	.49 to .51 mm.
Third instar	.66 to .68 mm.
Fourth instar	.84 to .85 mm.

The pupa is clear white in color and varies in length from 4.5 mm. to 5.5 mm. The elytra and wings overlap the fifth abdominal segment; the femora and tibiae are exposed and the hind tarsi reach the seventh abdominal segment. The caudal segment bears a pair of spines, the cremaster. No other spines are present.

Rearing Methods

Life history studies of **Lema sexpunctata** were carried on in a screen sided insectary where temperatures were as nearly normal as possible. The period of rearing of the immature stages extended from June 14 to July 26, 1938. Temperature was recorded by a thermograph and the mean for each day was determined by taking an average for each two-hour period. The average of daily means was determined to get the mean for duration of immature stages.

Half-pint jelly glasses were used as cages for rearing the immature stages. Moistened earth was placed in the glasses to a depth of about one-half inch. Leaves of the day flower were used as food for the larvae. Battery jars capped with muslin were used for preoviposition records of the adults. Some adults were also reared inside screen cages which were placed over plants growing in three-gallon stone jars. The habits of oviposition and spinning cocoons, were observed in these cages.

DURATION OF STAGES

The incubation period of 375 eggs of **Lema sexpunctata**, recorded at temperatures ranging from 23° to 29° C., varied from 2 to 6 days, the longer period occurring at lower temperatures. The average duration of incubation period throughout the entire series was 4.11 days. The eggs were deposited over a period of 35 days from June 17 to July 22.

Table 1. **Lema sexpunctata.** Duration of Incubation Period. 1938.

Temperature °C	Temperature °F	Duration of Egg Stage (Days) Average	Number of Eggs
23	73.4	4.88 ± .04	132
24	75.2	4.00 ± .00	54
25	77.0	3.95 ± .09	21
26	78.8	3.77 ± .07	48
27	80.6	3.52 ± .07	79
28	82.4	3.09 ± .10	32
Total			366

The feeding period of 199 larvae which were reared at daily mean temperatures ranging from 20° to 29° C. varied from 5 to 13 days. The average for the entire series of larvae reared was 7.80 days. These rearing records were secured between June 16 and July 23

Table 2. **Lema sexpunctata.** Duration of Larval Feeding Period. 1938

Temperature °C	Temperature °F	Duration of Larval Feeding Period (Days)	Number of larvae
23	73.4	9.41 ± .17	53
24	75.2	7.60 ± .25	41
25	77.0	7.40 ± .22	22
26	78.8	7.02 ± .16	48
27	80.6	6.59 ± .26	27
28	82.4	6.00 ± .00	4
Total			195

The entire period in the cocoon of 137 individuals reared at temperatures ranging from 20° to 29° C. varied from 8 to 13 days. The average of the period in the cocoon for the entire series was 10.56 days. In a small number of cocoons which were broken open for observation the prepupal period was 3 days.

Table 3. **Lema sexpunctata.** Duration of the Period in Cocoon. 1938

Temperature °C	Temperature °F	Duration of Period in Cocoon (Days)	Number of Cocoons
23	73.4	12.62 ± .14	24
24	75.2	11.65 ± .22	26
25	77.0	10.40 ± .13	25
26	78.8	9.60 ± .09	55
27	80.6	10.14 ± .26	7
Total			137

The preoviposition period of females in 9 different cages varied from 1 to 12 days. Two females required over 7 days for the preoviposition period and the average was 5.67.

At temperatures of about 28° C. it would be possible for **Lema sexpunctata** to develoop from the egg stage to an emerged adult in 17 days, allowing 3 days for incubation, 6 days for the larval feeding period and 8 days in the cocoon. In addition to this about 5 days would be required from emergence to sexual maturity of the adult. The total time required for the completion of the life cycle under optimal conditions therefore would be 22 days.

SEASONAL HISTORY

Lema sexpunctata hibernates as an adult. All stages can be found from May to September. The number of generations per year was not determined.

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2. Leng, Charles W. 1920. Catalogue of the Coleoptera of America north of Mexico, p. 287.

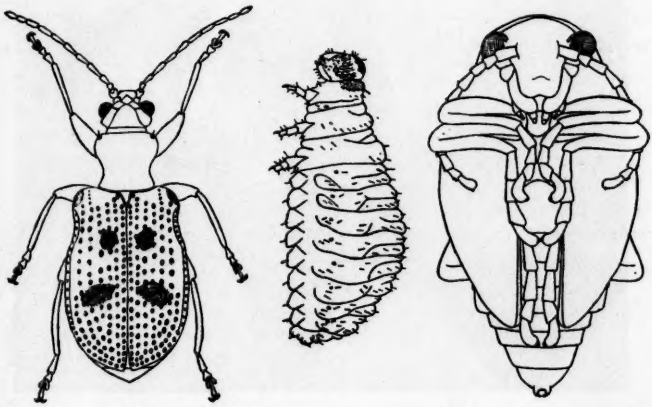


Plate 1. **Lema sexpunctata,** left to right, adult, larva, and pupa.

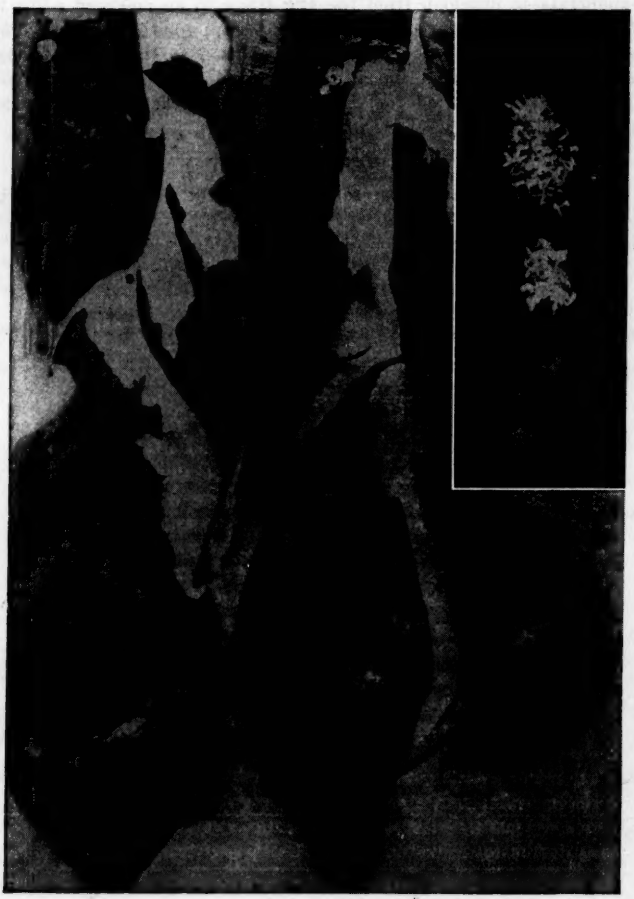


Plate 2. Stages of **Lema sexpunctata** Oliv. showing eggs, larvae, and cocoons, on foliage.

A NEW CORIXID FROM MEXICO

H. B. Hungerford, Lawrence, Kansas*

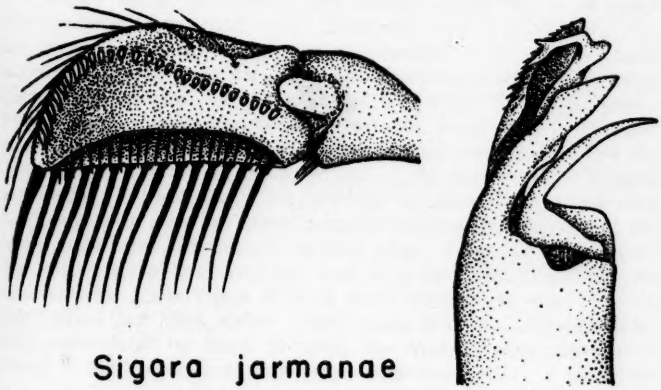
For many years I have had a couple of specimens of an undescribed Corixid from Santiago de las Vegas, Cuba. During the summers 1937 and 1938 Mr. Henry Thomas has collected good series of this same species in Chiapas, Mexico, and I therefore describe it.

Sigara jarmanae

Size: Length, 5.6 mm. to 6 mm.; width of head across the eyes, 1.8 mm. to 1.95 mm.

Color: General facies moderately light. Head, legs and venter pale, except venter of male abdomen which is more or less embrowned, the two basal segments having dark areas laterally. The pronotum crossed by seven to nine brown stripes which are narrower than the pale interspaces and margined by brown line; the brown markings of hemelytra in reticulations, not in transverse stripes except on base of clavus when they are erased on inner angle; pale indistinct line between corium and membrane; the hemelytra somtimes semihyaline with pattern indistinct.

Structural Characteristics: Head in both sexes rounded in front as viewed from above, interocular space at synthlipsis nearly as wide as an eye in the male. Frontal depression of male ovate, margin not prominent, not attaining eyes laterally. Postocular space narrow, broadest at inner angle of eye; antennal segments 1:2:3:4::9:7:17:9. Slight longitudinal median carina on anterior third of pronotum. Surface of pronotum moderately and clavus faintly



Sigara jarmanae

*Contributed from the Department of Entomology, University of Kansas.

rastrate. Lateral lobe of pronotum tongue-like in shape, about twice as long as wide. Metaxyphus long. Basal half of hind femur pilose beneath. Pala of male as shown in figure, 28 to 31 pegs in row. No strigular patch of pegs on base of femur. Measurements of front leg of male as follows: Femur: tibia: pala :: 15:7:11 (the pala and tibia measured on upper margin). The middle leg: Femur: tibia: tarsus: claws:: 45:22:14:21. The hind leg: Femur: tibia: 1st tarsal: 2nd tarsal:: 25:24:30:11. The male pala and genital capsule as shown in the drawings. The spinose left clasper and the unique modification of the end of the penial sheath are characteristic.

Described from 34 specimens labeled "Comitan, Chiapas, Mexico, Aug. 30, 1937, H. D. Thomas." A second lot taken Aug. 27, 1938, from same place and comprising 96 specimens. Specimens also come from Lake Tepancuapan, Chiapas, Mexico, Aug. 28, 1937; Ocozocoantla, Chiapas, Mexico, Sept. 3, 1937.

This same species has been taken in Cuba.

Location of Types: Holotype, allotype, and many paratypes in Francis Huntington Snow Collection, University of Kansas.

A NEW SPECIES OF PLEBEJUS KLUK FROM IDAHO

(Lepidoptera: Lycaenidae)

William D. Field, Lawrence, Kansas*

Plebejus atrapraetextus Field, n. sp.

Male: **Palpus** white covered with black scales along inner edge of terminal subsegment and with fringe of long, intermingled, black and white scales along outer edge of first and second segments. **Antenna** black annulated with white at the base of each subsegment. **Antennal club** black with a large group of white scales just below the tip on the upperside and dull dark brown below. **Head** white except for black color and a V-shaped area on frons, composed of tufts of long black scales. **Thorax** black, sparsely covered with long bluish white scales above and densely covered with white scales and long white hairs beneath. **Legs** white in color and hairy with black along upper side at base of each tarsal subsegment. **Abdomen** white beneath and black or dark brown above.

Wings above hyssop violet[1] with broad fuscous borders two millimeters in width along outer margin of fore wing and along fore and outer margin of hind wing. Veins fuscous, particularly in outer two-thirds of the wings. In the hind wings of some specimens the hyssop violet ground color encroaches upon the dark border along the veins giving the border a scalloped appearance. The fringe of scales along the outer margin of the fore and hind wing is white except for the basal third of its width which is fuscous. This fringe of scales is replaced by a fringe of white hairs along the inner margin of fore wing and by dirty brownish white hairs along the abdominal margin of hind wing.

Wings below, light pearl grey, almost white with a brownish cast, at least in the basal area. Fore wing with a black bar across the apical end of discal cell and a submesial series of six, nearly round, subsequal, black dots. A similar submesial row in hind wing contains seven dots. In both fore and hind wing this row is nearly parallel to the outer margin but is tortuose, particularly in the hind wing. Hind wing with a series of three round black spots across the base and a dark bar at the outer end of the discal cell. All black markings described above are outlined by pure white. Fore and hind wing with a narrow black marginal line that is thickened at the ends of the veins, particularly in hind wing. Fringe of scales along the outer edge of both fore and hind wing pure white in color. In the marginal white fringe of hind wing, adjacent to ends of veins there are a few black scales. These scales with the adjacent thickened portions of the black marginal line have the appearance of a series of black spots connected with a fine black line. In both fore

*Contributed from the Department of Entomology, University of Kansas.

[1]Color nomenclature used in this paper is from Ridgway, 1912.

and hind wing there is a submarginal row of round dark brown or black spots which in the hind wings, particularly in the lower half, are covered by metallic green scales. These submarginal spots in both fore and hind wing are surmounted by ochraceous buff or ochraceous orange lunules that become crescentic in shape in the lower half of the hind wing, with arms that extend outward along the veins to the marginal black line. These ochraceous spots are capped on their inner sides by narrow, bent, dark brown or black crescents. Between the series of submesial black spots (already described) and the submarginal markings, particularly in the hind wing, the ground color is nearly pure white.

Female: **Palpus, antenna, head** and **thorax** quite similar to those of the male. **Abdomen** dirty brownish white underneath and dark brown above.

Wings above Prout's brown, cinnamon brown or a shade between the two in color. A submarginal series of ochraceous buff or ochraceous orange cresents partially enclosing small dark brown spots on their outer sides and running along the outer margin is found in both fore and hind wing. Underneath the female is quite similar to the male except for a much warmer brownish cast to the ground color and except for a more distinct submarginal row of ochraceous buff or ochraceous orange lunules on the fore wing.

Comparative notes: This species belongs to the **anna-melissa** group of the genus **Plebejus.** It is quite distinct from all other North American members of the group, particularly in the possession of the rather wide fuscous border on the upper surfaces of the wings in the male sex. In the other members of this group there may be a fuscous or black marginal line, never more than one-fourth or one-half of a millimeter in width, along the outer margins of these wings. The maculation of the under surfaces shows its affinity to **anna,** but in **atrapraetextus** the maculation is more distinct as is evidenced in the larger and darker markings in the submarginal row and in the wider and darker marginal black line. **Atrapraetextus** is also closely related to **melissa** but the ochraceous submarginal markings are broad, forming a distinct and continuous band in this last species.

Data: Holotype, male, Priest River, Idaho, July 20; allotype, female, same data; paratypes, male, numbers 1 through 3, same data; paratype, male, number 4, same locality, July 11, 1927; paratypes, male, numbers 5 through 12, same locality, July 15, 1932; paratypes, male, numbers 13 and 14. Laclede, Idaho, July 6. All types collected by Mr. C. W. Herr of Woodburn, Oregon. Holotype, allotype and paratypes number 1, 2 and 13 in the author's collection. Paratypes number 5 through 12 in the collection of the Cheyenne Mountain Museum, Colorado Springs, Colorado. Paratype number 14 in the collection of C. W. Herr. Paratype number 3 to be deposited in the Francis Huntington Snow Entomological Collections, University of Kansas, Lawrence, Kansas. Paratype number 4 to be deposited in the Los Angeles Museum, Los Angeles, California.

INDEX--VOLUME 12
Journal of the Kansas Entomological Society

	Page
Aedes thibaulti Dyar and Knab, Habits of	70
Aligia, New Species of	105
Batazonus navus Cresson, Some Notes on the Nesting Habits of	87
Beamer, R. H., Articles by	26, 81
Bittacus strigosus, The Life Historp of . . . with a Description of the Larva	126
Blister Beetles at Nebraska Light Trap	118
Brathinidae, New to Arkansas	127
Bruce, W. G., Article by	91
Bryson, Harry R., Article by	94
Bugbee, Robert E., Article by	87
Calana, The Genus	81
Cave Beetle of the Subgenus Adelops from Oklahoma, A New	121
Corixid from Mexico, A New	133
Corixidae from Bolivia, Two New	97
Corixidae from Mexico, Two New	123
Doering, Kathleen, Note by	122
Dolichopodidae, Three New	83
Field, William D., Article by	135
Fulgorids, A Note on	122
German Roach, Some Factors Influencing the Number of Molts of	73
Green, Garvin, Article by	128
Hardy, D. Elmo, Article by	16
Harmston, F. C., Article by	83
Hepner, Leon, Article by	105
Horsfall, William R., Article by	70
Hungerford, H. B., Articles by	97, 123, 133
Hungerford, H. B., Notes by	31, 72
Insect Edaphology, Some Observations on	91
Isely, Dwight, Article by	30
James, Maurice T., Articles by	32, 37
Knowlton, G. F., Article by	83
Ladybird Beetles at Nebraska Light Trap	118
Leafhoppers, Four New Species of . . . and Notes on Two Others	26
Lema sexpunctata Oliv., The Biology of	128
Minutes of the 15th Annual Meeting	100
Phyllophaga from Texas, New and Little Known	47
Phyllophaga lanceolata Say, Some Recent Observations on the Activities of	94
Pipunculidae (Diptera), New Nearctic	16
Plebejus Kluk from Idaho, A New Species	135
Ptomaphagus cavernicola	117
Reinhard, H. J., Article by	47
Ritcher, P. O., Article by	64
Sanderson, Milton W., Articles by	1, 121
Sanderson, Milton W., Notes by	117, 127
Scarabaeidae, A New Genus . . . with Description and Notes on Phyllophaga	1

Seamans, Lois, Article by ---------- 73
Setty, L. R., Article by ---------- 126
Sigara griffini (Kirk.) . . . A Note on ---------- 72
Stratiomyidae, Studies in Neotropical ----------32, 37
Thyanta custator (Fabr.), Mass Flights of the Pentatomid . . . .
in Kansas ---------- 77
Uber Entomologische Sammlungen---Walther Horn ---------- 31
Vegetable Weevil in Arkansas, Distribution of the ---------- 30
Whelan, Don B., Article by ---------- 118
White Grub Pupation, Observation on ---------- 64
Wilbur, Donald A., Article by ---------- 77
Woodruff, Laurence C., Article by ---------- 73

73
26
72
37

77
31
30
18
64
77
78

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CONTENTS OF THIS NUMBER

New Species of Aligia (Homoptera Cicadellidae), Leon Hepner 105
Note on Ptomaphagus Cavernicola Sz in Arkansas Caves, (Note) Milton W. Sanderson ---------- 117
Blister Beetles and Ladybird Beetles taken at a Nebraska Light Trap, Don B. Whelan---------- 118
A New Cave Beetle of the Subgenus Adelops from Oklahoma, Milton W. Sanderson ---------- 121
A Note on Fulgorids, (Note) Kathleen Doering ---------- 122
Two New Corixidae from Mexico, H. B. Hungerford ---------- 123
The Life History of Bittacus Strigosus with a Description of the Larva, L. R. Setty---------- 126
A Family of Coleoptera, Brathinidae, New to Arkansas, (Note), Milton W. Sanderson ---------- 127
The Biology of Lema Sexpunctata Oliv., Garvin Green -------- 128
A New Corixid from Mexico, H. B. Hungerford---------- 133
A New Species of Plebejus Kluk from Idaho, William D. Field 135

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